# RackCDU™ Service Manual

# April 2015

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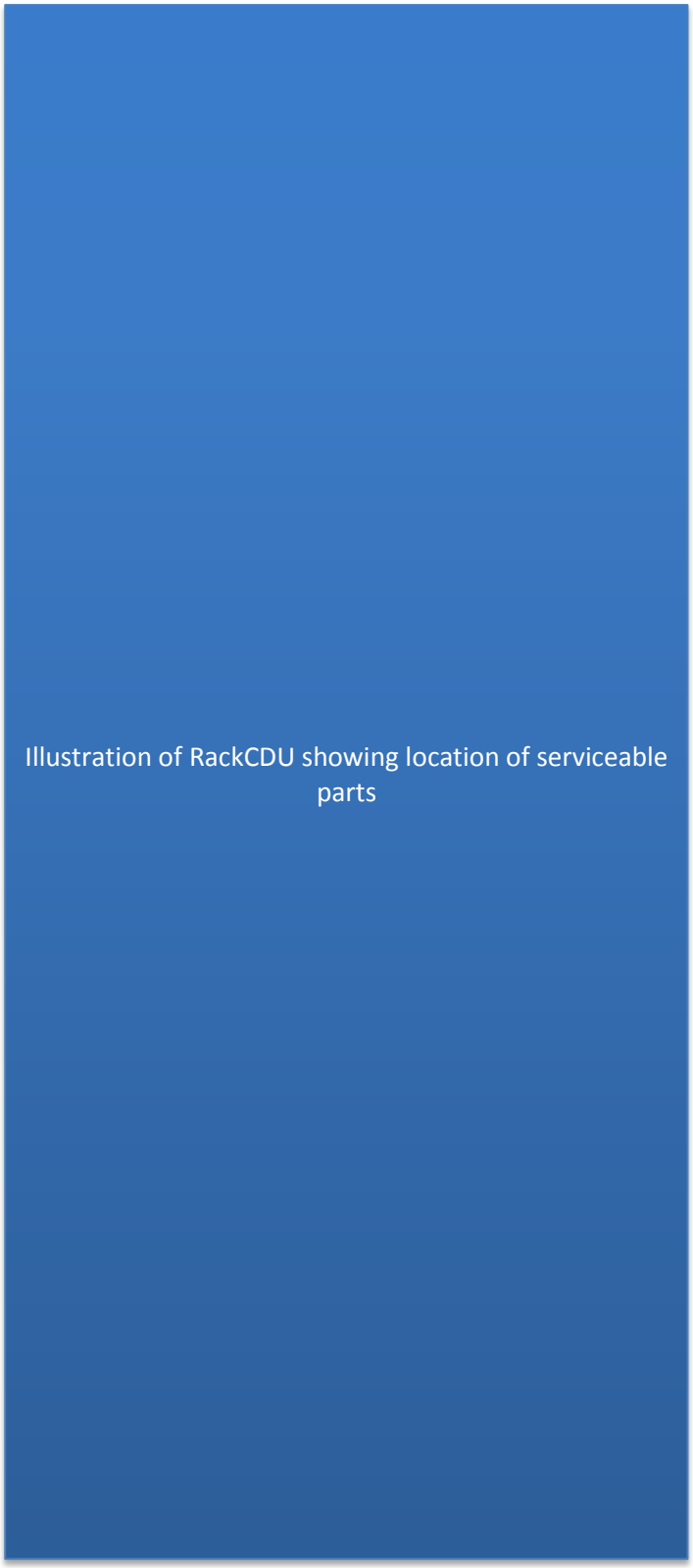
# 1 Introduction

This manual provides guidelines for servicing RackCDU systems. Server coolant is the only item with a routine service interval. This service consists of topping off the server coolant reservoir at the top of the RackCDU. This service is required following roughly 50,000 hours of operation.

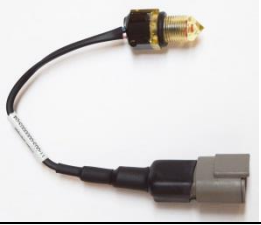
From time-to-time firmware updates may become available for the RackCDU monitoring system. Each firmware update will come with its own firmware updating instructions. However this manual includes general guideline for updating the firmware in a monitoring box.

The other serviceable items on the RackCDU include the sensors and monitoring system in the RackCDU and the RackCDU and quick connectors. These items are not expected to fail during normal operation of a RackCDU. The only reason to service these items is if they become damaged, lost or cease to function during the operational life of the RackCDU. A full list of the serviceable items appears in the Spare Parts List below.

Servicing some of the items on a RackCDU will require disconnecting the RackCDU from facilities water or the rack from power. Guidelines for disconnecting and connecting facilities liquid are included in this manual. Servicing some items requires unique tools. These tools are listed in the unique tools list below. These tools are available from Asetek.



# 2 Spare Parts List

| Asetek P/N | Description | Photo |
|---|---|---|
| 11-900-0000100 | Quick Connector, Male, Thread, RED | |
| 11-900-0000101 | Quick Connector, Male, Thread, BLUE | |
| 11-900-0000102 | Hex-Head Plug 1/2" (Reservoir Cap) | |
| 11-900-0000103 | Power supply Assembly 24 V 80W | |
| 11-900-0000104 | Control Box for RackCDU | |
| 11-900-0000115 | LED cable RackCDU | |
| 11-900-0000107 | Level sensor RackCDU |  |
| 11-900-0000106 | Leak sensor RackCDU | |
| 11-900-0000105 | Flow sensor RackCDU | |

| Asetek P/N | Description | Photo |
|---|---|---|
| 11-900-0000099 | Pressure Sensor, Facilities liquid | |
| 11-900-0000108 | Pressure Sensor, Server Coolant | |
| 35-650-0000004 | Coolant, 35% Glycol, 10L bottle | |
| 35-650-0000006 | Coolant, 35% Glycol, 5L bottle | |

# 3 Unique Tools

| Asetek SKU # | Description | Photo |
|---|---|---|
| 35-699-0000002 | Tool kit, Pump Priming Kit, Server Coolers | |
| 35-699-0000003 | Tool kit, Quick Connector Wrench Set | |
| 35-699-0000004 | Tool kit, RackCDU Test Cables | |
| 35-699-0000005 | Tool kit, Air Bleeding - Schrader valve | |
| 35-699-0000006 | Tool kit, Flow Tester, Asetek QC | |
| 35-699-0000007 | Tool kit, RackCDU drainer | |

# 4 Standard Tools

| | |
|---|---|
| Step Ladder | |
| Wet/dry (shop) Vacuum, 10 litter (2.5 gallon) capacity | |
| Funnel with a small end opening of 18 mm or less | |
| Screwdriver, #2 Philips | |
| Screwdriver, #3 Philips | |
| Drip Pan, ~4 cm (1.75 inches) tall, ~ 1 liter (1 quart) capacity | |
| Hex Wrench, size: 16mm | |
| Hex Wrench, size: 22mm | |
| Hex Wrench, size: 24mm | |
| Adjustable (Crescent) Wrench | |
| Wire cutters (Diagonal cutter) | |

# 5 Routine Maintenance

## 5.1 Refilling Server Coolant Reservoir

There is a reservoir at the top of the RackCDU extension. As the liquid cooling system runs, liquid gradually permeates through the rubber tubing and plastic parts in the system. The reservoir contains sufficient fluid to replenish the liquid that permeates out of the system for more than 50,000 hours of 24/7/365 operation. The RackCDU monitoring system will alert you when the fluid in the reservoir reaches a low point.

When a low coolant alert is received additional coolant may be added to the reservoir via a fill port at the top of the RackCDU. The RackCDU must be filled with manufacturer provided server coolant. Using water or other types of coolant will damage the server cooling system!

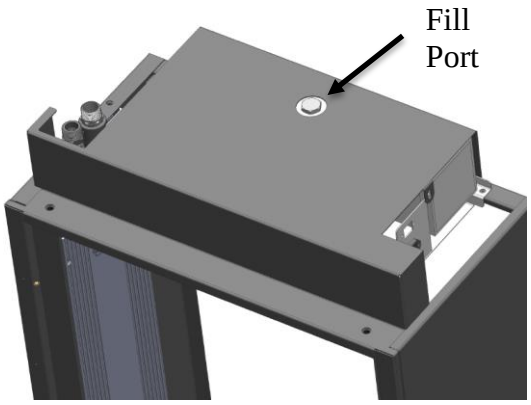
### 5.1.1 Parts Needed:

| Asetek P/N | Description |
|---|---|
| 35-650-0000006 | Asetek Coolant, 35% Glycol, 5L |

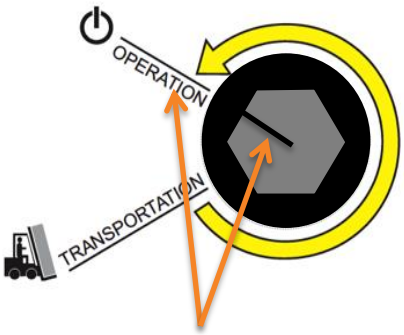
### 5.1.2 Tools Needed:

| Asetek P/N | Description |
|---|---|
| n/a | Hex Wrench, size: 22 mm |
| n/a | Funnel with a small end opening of 18 mm or less |
| n/a | Step Ladder |

### 5.1.3 Work Steps:



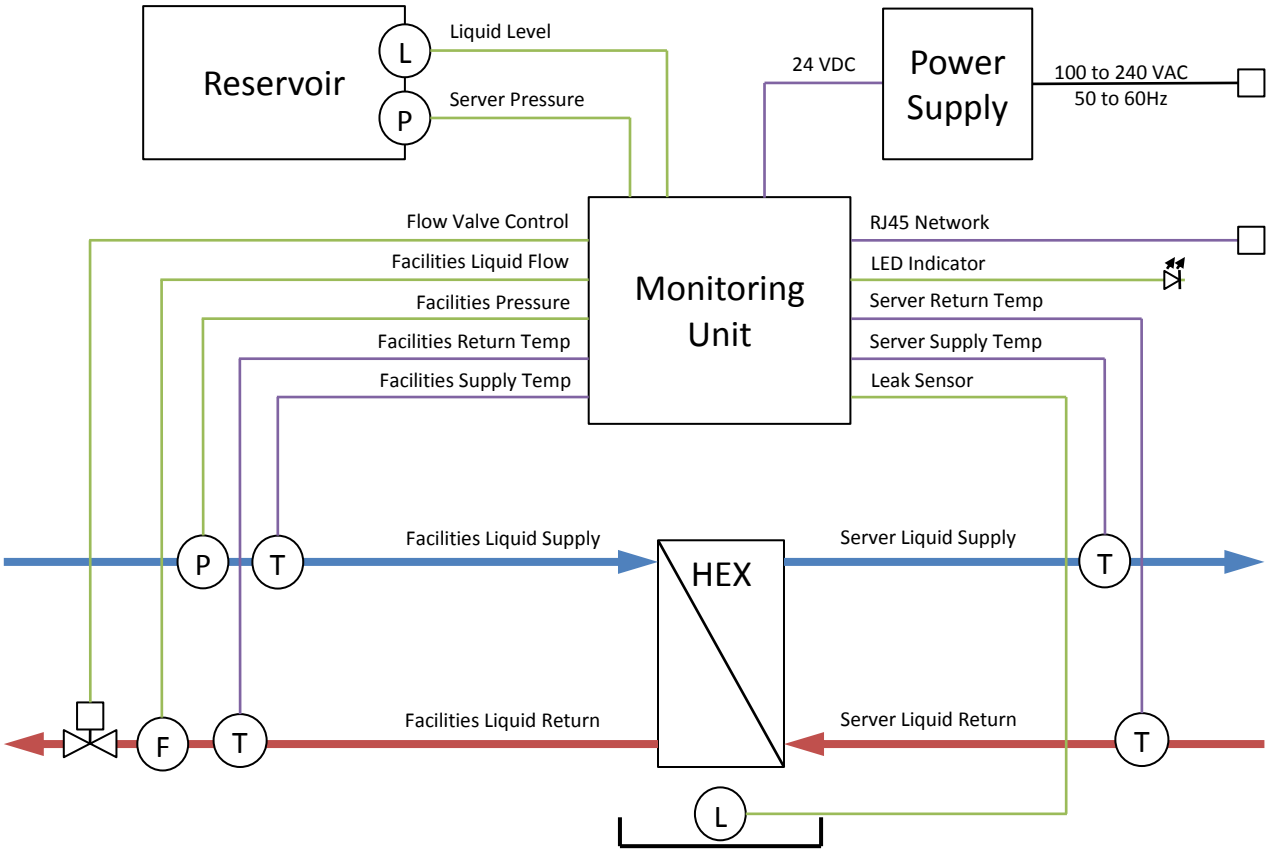

1. Remove power from the entire rack. This is to avoid the risk of electrical shock in the event of a spill.
2. Remove the fill cap and set to the side.
3. Place a funnel in the reservoir opening and add server coolant.
    a. When replacing coolant in response to a low level alarm from the RackCDU monitoring system add 3.5 liters.
    b. There should be an air gap of 20 mm (3/4 inch) between the top of the liquid and the top of the tank.
4. Replace the cap (the seal does not need to be replaced)
5. Screw the cap fully into the reservoir.
6. Unscrew the cap until the line on the cap is aligned with the “OPERATION” line on the top cover of the RackCDU as shown at right. This allows the tank to breathe with changing temperature and fluid volume.

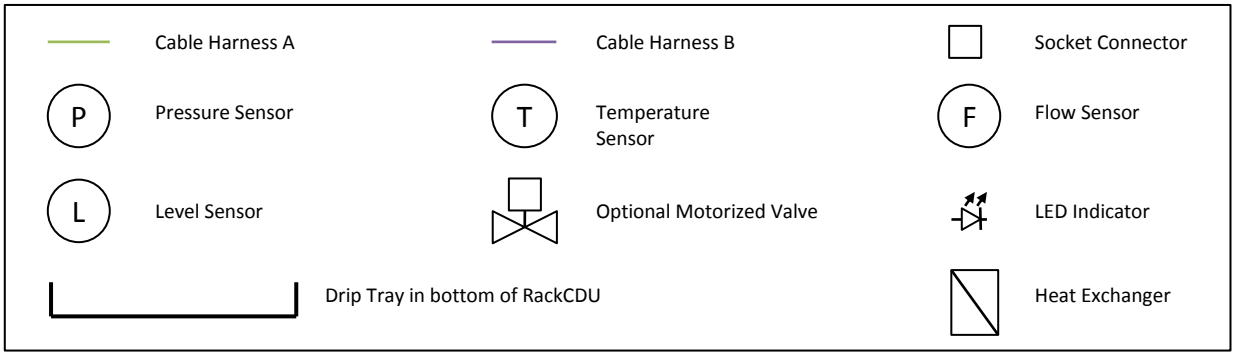



Align these two lines

# 6 Servicing the RackCDU Monitoring System

The RackCDU Monitoring system provides real time information on the operating condition of a RackCDU and can be configured to send warnings and alarms when operating conditions move beyond acceptable limits. The RackCDU monitoring system consists of the RackCDU Monitoring System box, a power supply, a network connection and an array of sensors. The diagram below illustrates the RackCDU monitoring system. This section focuses on the Monitoring Unit and Power Supply. Servicing of sensors is covered in subsequent chapters.



## 6.1 Update Firmware for RackCDU Monitoring System

Before you begin you will need to have a copy of the new firmware on a laptop computer and know the network address of the RackCDU monitoring box that you want to update. If you do not know the network address of the RackCDU Monitoring box you can discover it using Asetek's RackCDU TCPIP Discoverer software, see section 6.2.

The current firmware version number can be viewed on the About page of the RackCDU monitoring system. To view the about page, connect a PC to the same network as the monitoring system. Open a browser and type the network address of the RackCDU Monitoring system into the website address bar at the top of the browser window. When the RackCDU window displays, click on the About button at lower left. The Software Revision number is near the top center of the page.

Firmware updates may be accomplished from either Windows or Linux operating systems. Trivial File Transport Protocol TFTP is used to move the new firmware from the computer to the RackCDU. The commands used are different between Windows and Linux systems. Both command sets are below.

The DOS command "tftp" is used to transfer the new firmware into the monitoring box.

### 6.1.1 Parts Needed:

| Asetek P/N | Description |
|---|---|
| n/a | WebAgent.hex file (this file contains the new firmware) |

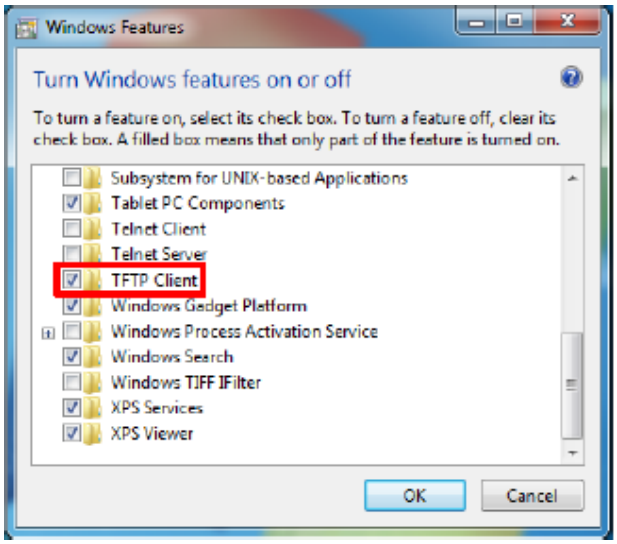
### 6.1.2 Tools Needed:

| Asetek P/N | Description |
|---|---|
| n/a | Laptop PC |
| n/a | Network Cable terminating with RJ45 connector |
| n/a | Step Ladder |

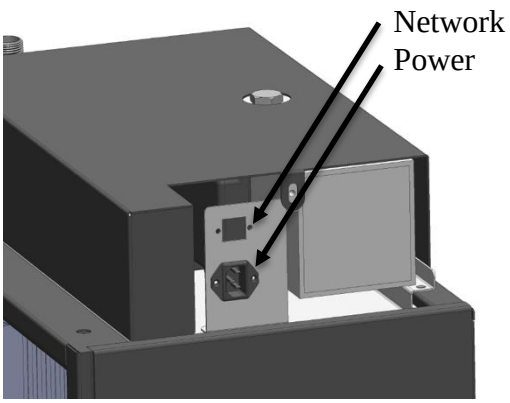
### 6.1.3 Work Steps when Updating Firmware from a Windows PC:

In the example used here the "WebAgent.Hex" file is saved in a folder named "c:\test" and the RackCDU Monitoring box has the network address 192.168.0.45.

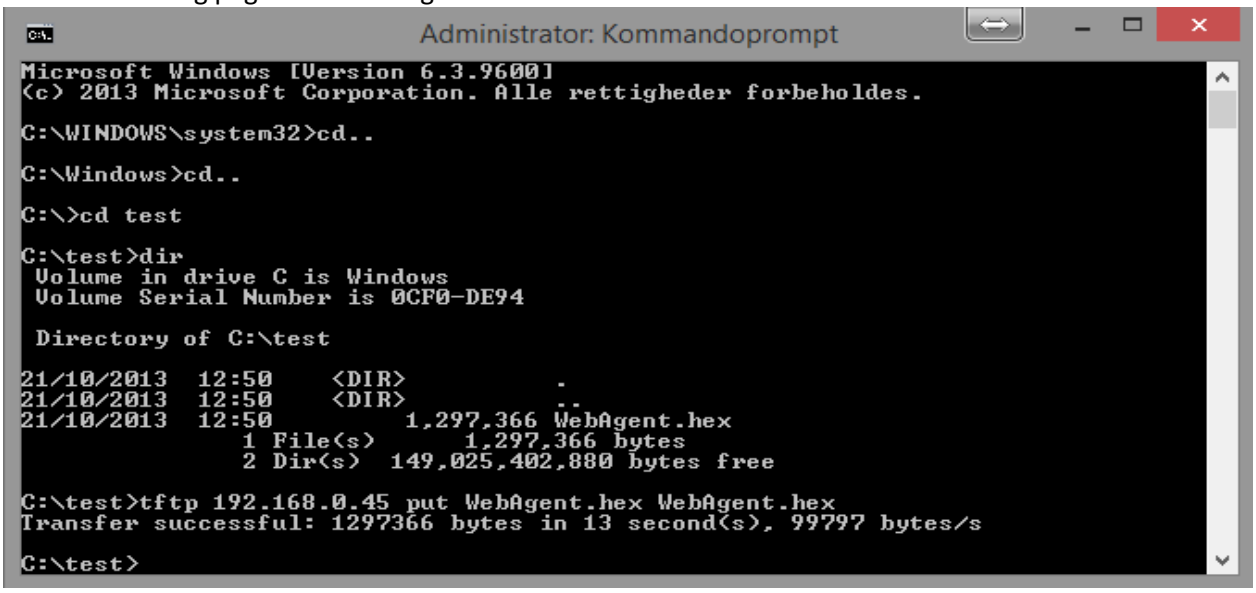
1. Save the file "WebAgent.hex" in a folder on a laptop.
2. Make sure that TFTP is enabled in Windows. Do this by opening the Control Panel and navigating to **Control Panel\Programs\Programs and Features** and selecting **Turn Windows features on or off**. In the left navigation menu make sure that **TFTP Client** is checked.


Windows Features
Turn Windows features on or off
To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.
Subsystem for UNIX-based Applications
Tablet PC Components
Telnet Client
Telnet Server
TFTP Client
Windows Gadget Platform
Windows Process Activation Service
Windows Search
Windows TIFF IFilter
XPS Services
XPS Viewer
OK
Cancel

3. Connect the network port of this laptop to the network port of the RackCDU, or to the network to which the monitoring box is connected.
4. Open a Windows Command Prompt window.
5. Navigate to the **folder** where the file “WebAgent.hex” is saved using the “change directory” command “cd”. In this example type:
   **cd..**
   **cd..**
   **cd test**
6. Once in the directory containing the file called “WebAgent.hex”, type the “tftp” command. In this example type:
   **tftp –i 192.168.0.45 put WebAgent.hex WebAgent.hex**




7. After about 15 second the “Transfer successful” will appear.
8. Close the command prompt.
9. Confirm that the firmware has been updated by using a web browser to open the RackCDU monitoring page and checking the software revision on About screen

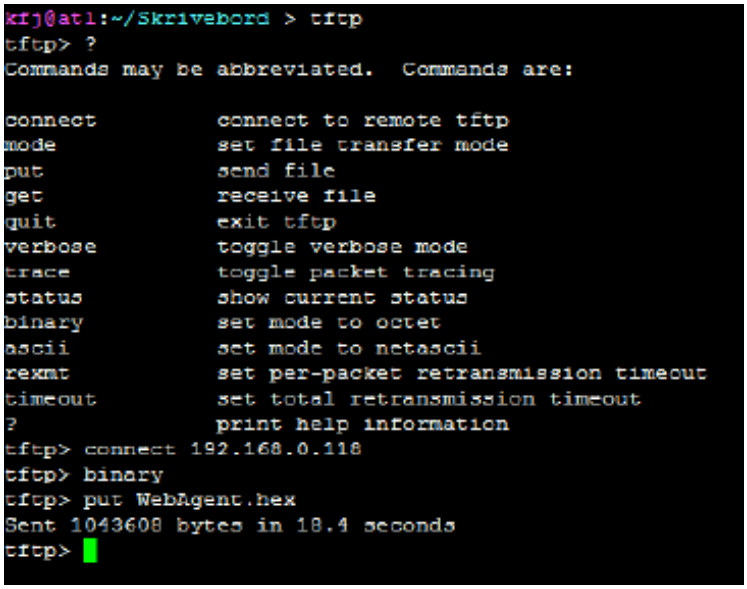



### 6.1.4 Work Steps when Updating Firmware Update a Linux Computer

In the example used here the ”WebAgent.Hex” file is saved in a folder named “c:\test” and the RackCDU Monitoring box has the network address 192.168.0.118.

1. Save the file “WebAgent.hex” in a folder on the Linux computer.
2. Connect the network port of this computer to the network port of the RackCDU, or to the network to which the monitoring box is connected.
3. From the Linux command line
4. Navigate to the **folder** where the file “WebAgent.hex” is saved using “change directory” commands.
5. From the directory were the “WebAgent.hex” file is stored type:
   **tftp**
   **connect 192.168.0.118**
   **binary**
   **put WebAgent.hex**

6. Linux will respond with a message that tells you the number of bytes sent and the time spent sending them
7. Open the RackCDU web site and confirm that the firmware has been updated by looking at the software version number on the About tab.



## 6.2 Determining the Network Address of a RackCDU Monitoring Box

If the RackCDU Monitoring is getting its network address assigned to it by a DHCP server, the address assigned by the DHCP server can be discovered using Asetek TCPIP Discoverer software. Asetek TCPIP Discoverer is a Java application that can run on any PC with Java installed. This PC must be connected to the same network as the DHCP server and the RackCDU Monitoring Box.

### 6.2.1 Tools Needed:

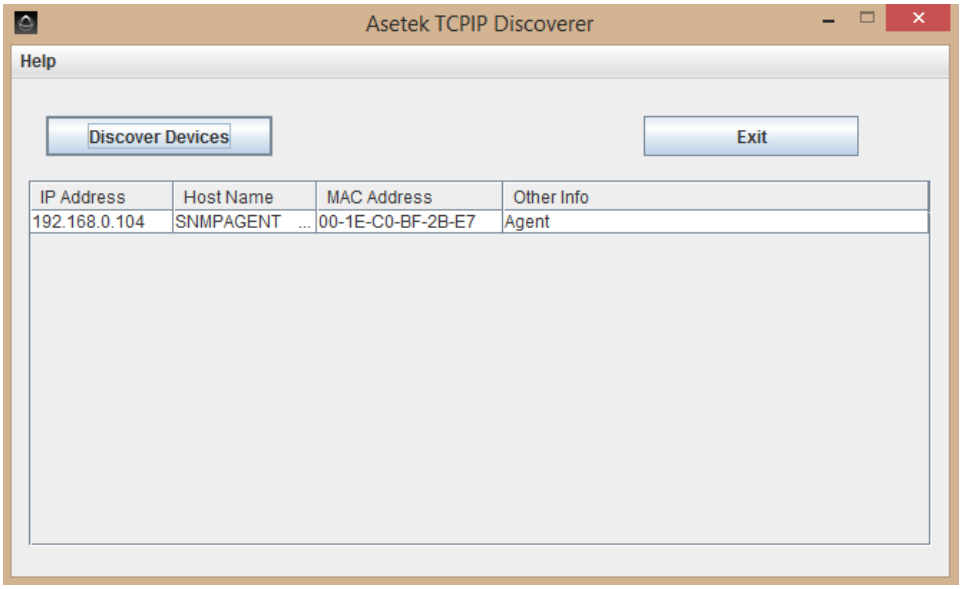
| Asetek P/N | Description |
|---|---|
| | Asetek RackCDU TCPIP Discoverer software |
| n/a | Laptop PC |
| n/a | Network Cable terminating with RJ45 connector |

### 6.2.2 Work Steps:

1. Connect a PC with Java and the TCPIP Software (TCPIP Discoverer.jar) on it to the network with the DHCP server and the RackCDU Monitoring system on it.
2. Open the program TCPIP Discover.jar from the desktop or at the Command line type:

   **java -jar TCPIP Discoverer.jar.**

3. Click the “Discover Devices” button to scan for connected RackCDU monitoring boxes.
4. The program will automatically find all the control boxes on the same subnet.



## 6.3 Trouble Shooting the RackCDU Monitoring System

This section covers replacing the monitoring box and/or it's power supply. Both the monitoring box and its power supply are located at the top of the RackCDU under the top cover.

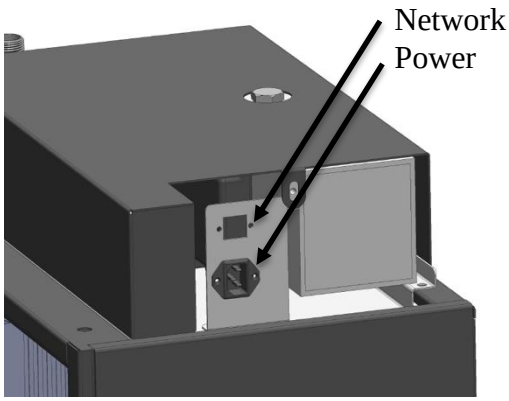
### 6.3.1 Tools Needed:

| Asetek P/N | Description |
|---|---|
| | #2 Philips Screwdriver |
| | Step Ladder |
| | Laptop PC |
| | Network Cable terminating with RJ45 connector |
| | Multi-meter |

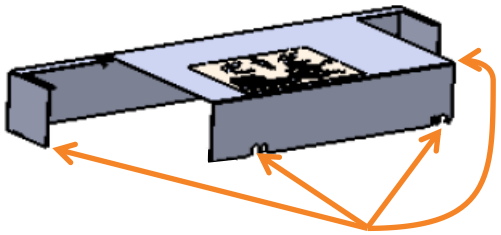
### 6.3.2 Trouble Shooting a RackCDU Monitoring Box

When the RackCDU monitoring system is functioning properly the white LED near the top of the RackCDU should be illuminated and the web interface should be viewable by pointing a web browser at the network address of the monitoring box.

If the white LED is off and the web page from the monitoring box does not display: begin by checking the power system for the RackCDU.




1. Check that the power cord for the monitoring box is fully plugged into a power strip and that the strip is on.
2. Check that the power cord is fully plugged into the socket on the top right side of the RackCDU below the network port.
3. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings..
4. Lift off the cover and set it aside
5. Check that the cord from the rear of the power cable socket is fully plugged into the power supply
6. Check that the cable from the power supply and the cable to the monitoring box are fully connected.



Screw locations for removing cover

**If all of these elements are in good working order, begin by testing the power supply.**

7. Disconnect the cable between the power supply and the monitoring box. Check that the power supply is delivering 24VDC. Pin 1 is ground and pin 2 is 24VDC. If it is not delivering the required voltage, replace the power supply.

**If the power supply is working, check the power to the LED indicator:**

8. Disconnect the LED cable from the monitoring box and test that the monitoring box is delivering 3.3VDC to the LED. Pin 1 is 3.3VDC and Pin 2 is ground. If it is not change the monitoring box. If 3.3VDC is being delivered, replace the LED assembly.

**If the LED Light is on but the web page from the monitoring box does not display, begin by checking the network address of the monitoring system using TCPIP Discoverer. If you are unable to determine the network address by using the TCPIP Discoverer program it may be necessary to reset the monitoring box.**

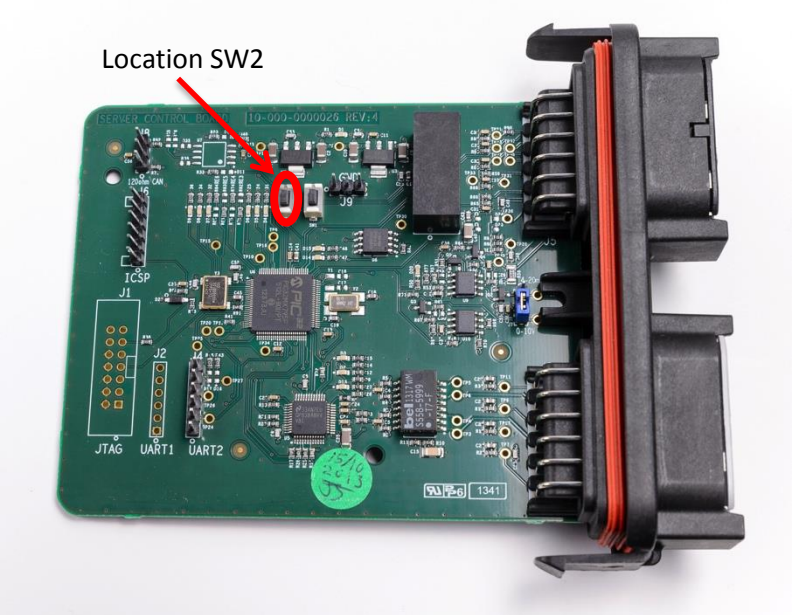
## 6.4 Resetting the Monitoring box

Resetting the monitoring box will replace all of the current settings in the box with the original factory defaults. Doing this turns on automatic network address assigning from a DHCP server and resets the static network address of the box to the factory defaults. The user name and password are both reset to “admin”. This allows direct access to the monitoring box web page using a browser and by connecting directly from a notebook to the box with a network cable. Configure the notebook’s network adaptor to use the same subnet mask and gateway as the monitoring box and an address in the subnet besides 199. Point your browser at the box using the following address information. Use your browser to reset the network address

IP address: 192.168.0.199
Gateway: 192.168.0.1
Subnet mask: 255.255.255.0

1. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings.
2. Lift off the cover and set it aside.
3. Disconnect all of the sensor cables that share the same block header to the monitoring box as the power supply.
4. Disconnect the remaining block header.
5. Remove the screw holding the box in place and take both the power supply and the control box out of the RackCDU.
6. On a bench, separate the block header section of the monitoring box from the main housing by pinching the latches on the narrow sides of the box and pull out the PCA.
7. Connect the power supply to power.
8. With power on the monitoring PCB, press and hold the switch at location SW2 for about 10 seconds.
9. Use the default network address information above to directly connect to the monitoring box with a PC.
10. When the web page displays, you can reset the network addressing to what it needs to be for your network. If the web page does not display (and your PC’s network card is setup properly to access this address directly via a local connection), replace the monitoring box.

Illustration showing screw locations of RackCDU Cover, looking from rack side of RackCDU



## 6.5 Replacing the Monitoring Box

The monitoring box is located at the top of the RackCDU under the top cover. All of the connections to the monitoring box are made with a pair of connectors that are easily disconnected from the box should it need to be replaced.

### 6.5.1 Parts needed:

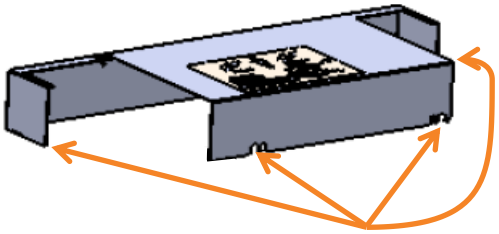
| Asetek P/N | Description |
|---|---|
| 11-900-0000104 | Control Box for RackCDU |

### 6.5.2 Tools needed:

| Asetek P/N | Description |
|---|---|
| | #2 Philips Screwdriver |
| | #3 Philips Screwdriver |
| | Step Ladder |

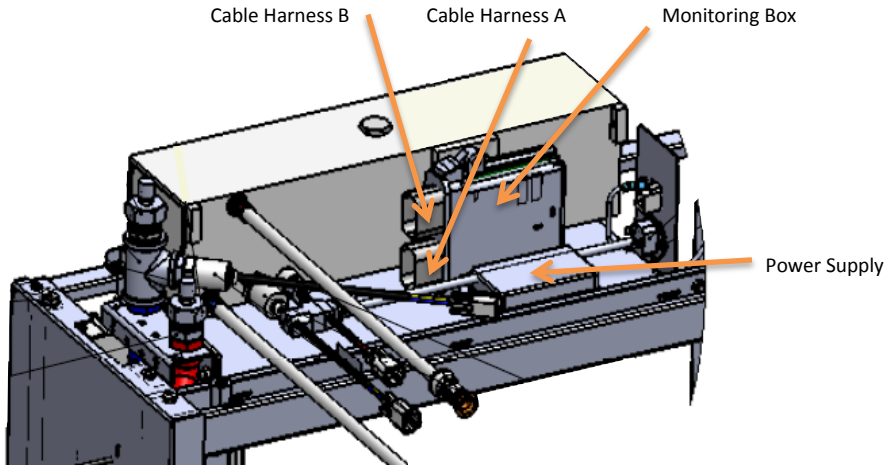
Illustration showing screw locations of RackCDU Cover, looking from rack side of RackCDU

### 6.5.3 Work Steps:



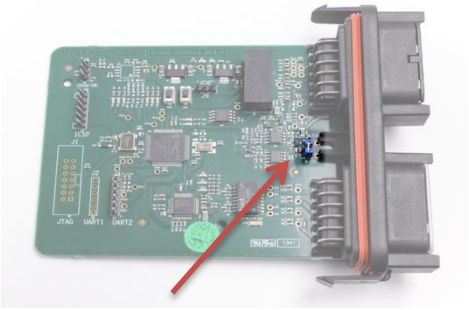
Screw locations for removing cover

1. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings.
2. Lift off the cover and set it aside.
3. Disconnect Power to the Power supply.
4. Disconnect these two cable harnesses from the control box
5. Remove the Monitoring Box by removing the 2 bolts; one in each side.
6. Open the Monitoring box by pressing the two tabs on either side of the box and pulling the connector end out of the box end.



Press these tabs to remove the electronics

7. Check the position of the control signal jumper.
   a. If it is in the 0-10V position you can install the replacement monitoring box without opening it.
   b. If the jumper is in the 0-20µAmp position, you must first open the replacement monitoring box and move the jumper from the 0-10V position to the 0-20µAmp position and close the box.
8. Install the new Control Box using the two screws removed in step 5.
9. Connect the two cables harness to the control box. These cable connections are keyed differently and cannot be interchanged.
10. Connect the power to the power supply.



Jumper to select 0-10V or 4-20mA control

## 6.6 Replacing the Power Supply

The power supply is located at the top of the RackCDU immediately behind the top cover. All of the connections to the power supply are made with plugs that are easily disconnected from the supply should it need to be replaced.

### 6.6.1 Parts needed:

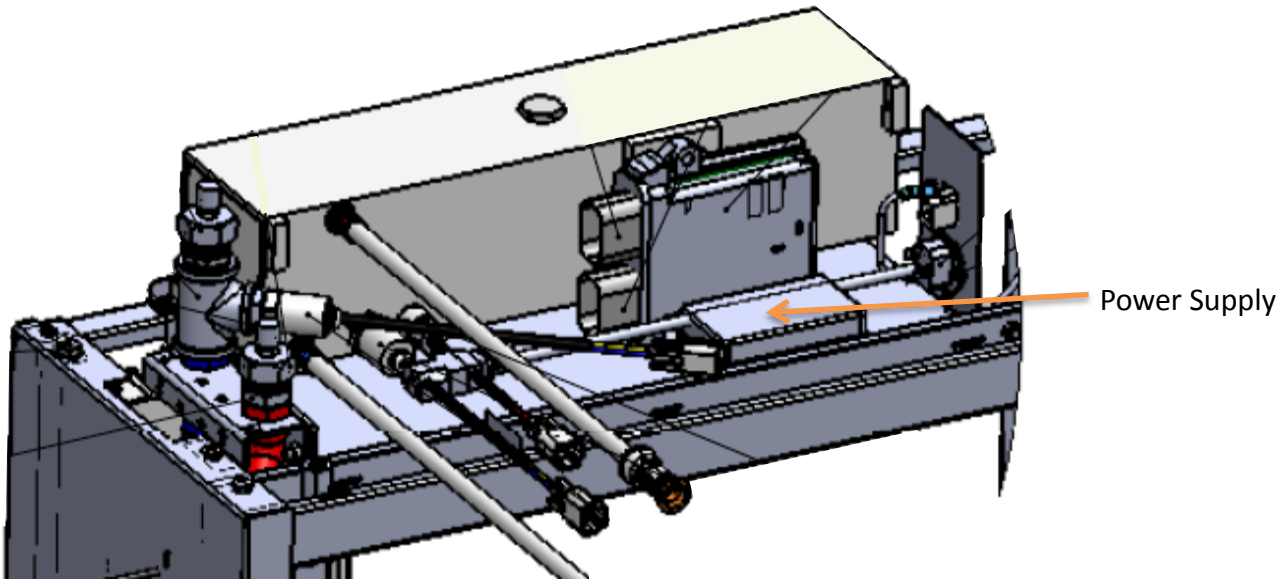
| Asetek P/N | Description |
|---|---|
| 11-900-0000103 | Power supply Assembly 24 V 80W |
| | Double adhesive tape (RS: 685-1661) |

### 6.6.2 Tools needed:

| Asetek P/N | Description |
|---|---|
| | Double adhesive tape (RS: 685-1661) |
| | #2 Philips Screwdriver |
| | Step Ladder |

### 6.6.3 Work Steps:

1. Disconnect the power cable on the right outside face of the RackCDU top enclosure.
2. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings.
3. Disconnect the power to the Power Supply
4. Disconnect the power core to the Control Box
5. Remove the Power Supply, which is fixed with tape.
6. Tape in the new Power Supply in at the same spot.
7. Connect the power core to the Control Box.
8. Connect the power cable to the power supply.
9. Replace the top cover
10. Reconnect the power cable on the right outside face of the RackCDU top enclosure.



## 6.7 Replacing the Facilities Pressure Sensor

The facilities side pressure sensor is located at the top of the RackCDU. The only service available for a Facilities Pressure Sensor is to remove and replace it. This service requires shutting down all the servers attached to the RackCDU, disconnecting the RackCDU from facilities liquid and at least partially draining facilities liquid from the RackCDU.

Once the malfunctioning sensor is replaced the RackCDU must be reconnected to facilities liquid and in the case of a RackCDU that receives liquid from the bottom, air must be bled from the system.

### 6.7.1 Parts Needed:

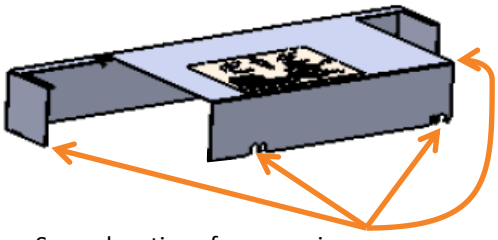
| Asetek P/N | Description |
|---|---|
| 11-900-0000099 | Pressure Sensor, Facilities Liquid |

### 6.7.2 Tools Needed:

| Asetek P/N | Description |
|---|---|
| 35-699-0000005 | Tool Kit Air bleeding – Schrader valve |
| n/a | #2 Philips Screwdriver |
| n/a | Step Ladder |
| n/a | Wrench, 24mm |
| n/a | Low-sided pan |
| n/a | Wet/dry vacuum |

### 6.7.3 Work Steps:

1. Shut down (power off) all servers connected to the RackCDU.
2. Shut off the valves on both the supply and return side of the facilities liquid loop. These valves are part of the facilities loop and are not located in the RackCDU.
3. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings.



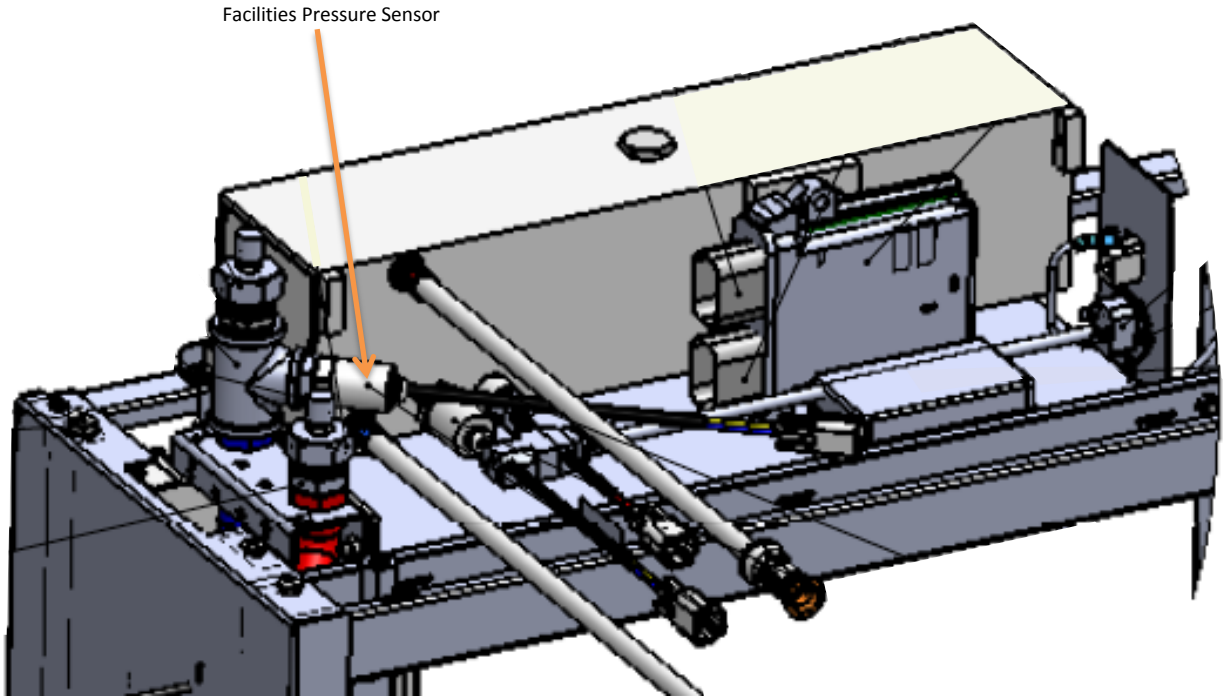
Screw locations for removing cover

4. Set the cover aside.
5. Use the Tool Kit Air bleeding – Schrader valve and the low sided pan to take the pressure off of the liquid in the RackCDU and to partially drain the system.

   a. Put the open end of the tool in the low-sided pan and hold in place. Pressure will cause the tube to come out of the pan if not held in place.
   b. Put the hose from the wet/dry vacuum into the low-sided pan and hold in place. Turn on the wet/dry vacuum.
   c. Put the Schrader valve end of the tool on the Schrader valve and allow the pressure to bleed off into the pan. The Schrader valve is located at the opposite end of the RackCDU from where the RackCDU is connected to facilities liquid. Schrader valve is on the top for bottom fed RackCDUs and on the bottom for top fed RackCDUs.
      i. For top fed RackCDUs allow all of the liquid to drain into the pan and get sucked into the wet/dry vacuum (there are about 3 liters of liquid in the RackCDU plus the liquid in the tubes/plumbing between the RackCDU and shutoff valve. Then remove the Schrader Bleed kit.

ii. For bottom fed units, install a second bleed kit and use the wet/dry vacuum to draw about a quarter of a liter of liquid out of the RackCDU. Then remove both Schrader bleed kits.

6. The pressure sensor is located at the top of the RackCDU. It screwed into a “T” at the top of the facilities liquid supply line.




7. Disconnect the pressure sensor from the RackCDU Monitoring system cable harness.
8. Use the 24mm wrench to remove the malfunctioning pressure sensor.
9. Install the new pressure sensor into the T fitting with the wrench.
10. Connect the pressure sensor cable to the cable harness for of the monitoring system.
11. Check the Sensors page on RackCDU monitoring system web page. Both the “Facility pressure:” and “Facilities water flow:” should read zero and show red indicators.
12. Open the valves on both the supply and return side of the facilities liquid loop.
13. Recheck the RackCDU Monitoring system. Facilities pressure: should show a positive pressure and both Facilities pressure and Facilities water flow should have green indicators. A red on Facilities water flow would indicate that at least one facilities side valve was not opened properly. If there is a red, recheck the valves.
14. For bottom fed systems, place the open end of a Schrader bleed valve kit in the low-sided pan. Then bleed the air from the system by attaching the kit to one of the two Schrader valves until bubbles stop flowing from the tube. Repeat this process on the second Schrader valve. If the low-sided pan starts to fill, use the wet/dry vacuum to suck the liquid out of the pan. (Air bleeding is not needed for top fed RackCDUs.)
15. Replace the top cover.
16. Once the “Facilities water flow:” shows green, power on all of the servers connected to the RackCDU.

## 6.8 Replacing the Server Coolant Pressure Sensor

The server coolant pressure sensor is connected to the server coolant reservoir located at the top of the RackCDU extension. The only service available for the server coolant pressure sensor is to remove and replace it.

### 6.8.1 Parts Needed:

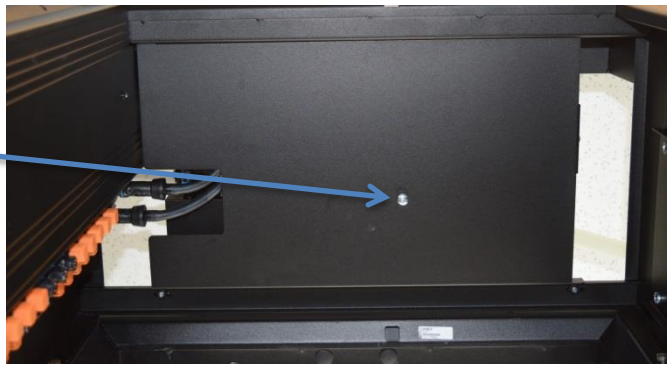
| Asetek P/N | Description |
|---|---|
| 11-900-0000108 | Pressure Sensor, Server Coolant |

### 6.8.2 Tools Needed:

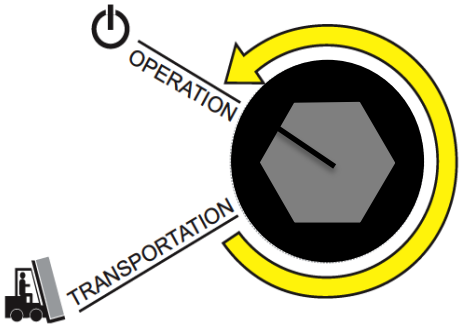
| Asetek P/N | Description |
|---|---|
| n/a | #2 Philips Screwdriver |
| n/a | Step Ladder |
| n/a | Wrench, 24mm |
| | Low-sided Pan |
| | Funnel with a small end opening of 18 mm or less |

### 6.8.3 Work Steps:

1. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings.
2. Set the cover aside.
3. Disconnect the power to the control box.
4. Disconnect Reservoir from the Server Coolant Supply and Return manifolds by disconnecting the top quick connector on each manifold. (Push the quick connector toward the RackCDU until it stops. While still pushing, rotate it counter-clockwise until it stops and pull the connector away from the manifold.)
5. Remove the 5 screws holding the reservoir to the extension: one in each side and two at the lower rear edge of Reservoir and one below the shelf holding the Reservoir.
6. Disconnect level sensor and the pressure sensor cables from the cable harness.
7. Uninstall the control box from the Reservoir by removing the 2 screws at the top and bottom of the box.
8. Lift the reservoir from the extension and move it to a workbench.
9. Remove the cap on the top of the reservoir.
10. Make sure the low-sided pan is clean and then invert the reservoir over the pan to drain the cooling liquid from the reservoir.
11. Set the pan and coolant aside.
12. Use the 24mm wrench to remove the old pressure sensor.
13. Apply plumber's putty and install the new pressure sensor, using the 24mm wrench to tighten it into place.
14. Use the funnel and return the coolant from the low-sided pan to the reservoir
15. Replace the cap screwing it fully into the reservoir with your fingers.
16. Reattach the reservoir to the RackCDU extension – five screws.
17. Connect the pressure sensor and level sensor cables to the harness.



18. Reinstall control box on Reservoir.
19. Reconnect power to the control box.
20. Replace the top cover.
21. Reconnect the Reservoir to the RackCDU by connecting the Red Female Connector from the Reservoir to the top Red Male Connector on the RackCDU and the Blue Female Connector from the Reservoir to the top Blue Male Connector on the RackCDU.
22. Rotate the reservoir cap counter-clockwise until the line on the cap aligns with the “OPERATION” line on the top cover.



## 6.9 Replacing the Facilities Flow Sensor

The flow sensor is located at the top or the bottom of a RackCDU at the point where the RackCDU is connected to facilities liquid. The only service available for this sensor is to remove and replace it. This service requires shutting down all the servers attached to the RackCDU, disconnecting the RackCDU from facilities liquid and at least partially draining facilities liquid from the RackCDU.

Once the malfunctioning sensor is replaced the RackCDU must be reconnected to facilities liquid and in the case of a RackCDU that receives liquid from the bottom, air must be bled from the system.

### 6.9.1 Parts needed:

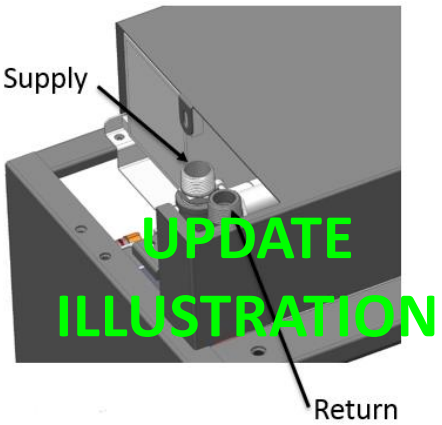
| Asetek P/N | Description |
|---|---|
| 11-900-0000105 | Flow sensor RackCDU |
| n/a | Plumber's putty |

### 6.9.2 Tools needed:

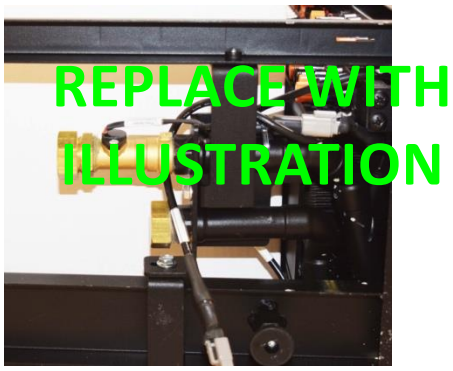
| Asetek P/N | Description |
|---|---|
| 35-699-0000005 | Tool Kit Air bleeding – Schrader valve |
| n/a | #2 Philips Screwdriver |
| n/a | Step Ladder |
| n/a | 2 Adjustable Wrenches, 8 inch |
| n/a | Low-sided pan, ~10 cm (4 inches) tall, minimum 4 liter (4 quart) capacity |
| n/a | Wet/dry vacuum |

### 6.9.3 Work Steps:

1. Shut down (power off) all servers connected to the RackCDU.
2. Shut off the valves on both the supply and return side of the facilities liquid loop. These valves are part of the facilities loop and are not located in the RackCDU.
3. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings.
4. Set the cover aside.
5. Use the Tool Kit Air bleeding – Schrader valve and the low sided pan to take the pressure off of the liquid in the RackCDU and to partially drain the system.




   a. Put the open end of the tool in the low-sided pan and hold in place. Pressure will cause the tube to come out of the pan if not held in place.
   b. Put the hose from the wet/dry vacuum into the low-sided pan and hold in place. Turn on the wet/dry vacuum.
   c. Put the Schrader valve end on the tool on the Schrader valve and allow the pressure to bleed off into the pan. The Schrader valve is located at the opposite end of the RackCDU from where the RackCDU is connected to facilities liquid. Schrader valve is on the top for bottom fed RackCDUs and on the bottom for top fed RackCDUs.
      i. For top fed RackCDUs allow all of the liquid to drain into the pan and get sucked into the wet/dry vacuum (there are about 3 liters of liquid in the RackCDU plus the liquid in the



tubes/plumbing between the RackCDU and shutoff valve). Then remove the Schrader Bleed kit.

ii. For bottom fed units, move the low-sided pan to a location under where the facilities liquid lines connect to the RackCDU, re-secure the wet/dry vacuum hose in the low-sided pan and turn it on.

6. Disconnect the facilities liquid line that connects to the RackCDU line with the flow sensor. On bottom fed units allow the RackCDU and the hose to drain into the low-sided pan and get sucked up by the wet/dry vacuum.
7. Use the wrenches to remove the hose connection hardware (CamLock or Tri-Clamp fittings) from the facilities return connection on the RackCDU.
8. Disconnect the flow sensor cable from the RackCDU sensor harness. For bottom fed units this connection should be near the bottom of the RackCDU and for top fed units it will be near the RackCDU monitoring box
9. Use a wrench to remove the malfunctioning flow sensor
10. Use a wrench to install the new flow sensor.
11. Connect the flow sensor cable to the RackCDU Monitor wire harness.
12. Use the wrenches to reinstall the hose connection hardware (CamLock or Tri-Clamp fittings on the facilities return connection of the RackCDU.
13. Open the valves on both the supply and return side of the facilities liquid loop.
14. Recheck the RackCDU Monitoring system. Facilities water flow should have green indicators. A red on Facilities water flow would indicate that at least one facilities side valve was not opened properly. If there is a red, recheck the valves.
15. For bottom fed systems, place the open end of a Schrader bleed valve kit in the low-sided pan. Then bleed the air from the system by attaching the kit to one of the two Schrader valves until bubbles stop flowing from the tube. Repeat this process on the second Schrader valve. If the low-sided pan starts to fill, use the wet/dry vacuum to suck the liquid out of the pan. (Air bleeding is not needed for top fed RackCDUs.)
16. Replace the top cover.
17. Once the “Facilities water flow: shows green, power on all of the servers connected to the RackCDU.

## 6.10 Replacing the LED Indicator

The LED indicator is mounted in a dispersing lens near the top of the decorative wing on the RackCDU.

### 6.10.1 Parts needed:

| Asetek P/N | Description |
|---|---|
| 11-900-0000115 | LED cable RackCDU |

### 6.10.2 Tools Needed:

| Asetek P/N | Description |
|---|---|
| n/a | #2 Philips Screwdriver |
| n/a | Step Ladder |
| n/a | Small flathead jeweler's screw driver |
| n/a | 50cm of narrow gage wire, or string |
| n/a | Wire cutters |

### 6.10.3 Work Steps:

1. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located on the bottom lip of the cover return wings.
2. Set the cover aside.
3. Disconnect the LED cable from the harness attached to the control box; the cable is labeled "LED".
4. There is a black collar that surrounds the LED. Use the jeweler's screw driver to gently pry the collar away from the manifold, then pull the collar out of the manifold a short distance.
5. Remove the collar from the LED. Note: the collar has locking tabs. When the collar is pushed into the hole in the RackCDU these tabs bite into the LED cable. Twist the collar and the cable in opposite directions to disengage these tabs and then slide the collar over the LED.
6. Tie the string or wire around the cable at the base of the LED.
7. Slowly push out the LED and cable through the LED pocket in the RackCDU.
8. Pull the plug end of the cable up, lifting the LED out of the RackCDU. Take care not to pull the string all the way through the hole in the RackCDU!!!
9. Untie the string from the old LED, and tie it to the new LED.
10. Pull on the string to guide the new LED to the hole in the RackCDU.
11. Untie the string
12. Place the new collar over the new LED.
13. Insert the new LED and collar into the LED pocket in the RackCDU.
14. Connect the plug on the new LED cable to the socket on the control box harness labeled LED.
15. Replace the top cover.

## 6.11 Replacing the Leak Sensor

The leak sensor is mounted in the spill tray at the bottom of the RackCDU, and is slightly underneath the decorative wig on the RackCDU manifold. There are two connectors on the leak sensor cable, one in the top of the RackCDU near the control box and another at the bottom of the RackCDU. When changing the leak sensor only disconnect the bottom connection.

Note: this sensor looks very much like the reservoir level sensor. However the function is different and the two sensors are not interchangeable. Double-check the label on the cable to make sure you have the correct part.

### 6.11.1 Parts needed

| Asetek P/N | Description |
|---|---|
| 11-900-0000106 | Leak sensor RackCDU |

### 6.11.2 Tools needed

| Asetek P/N | Description |
|---|---|
| | Wrench: 16 mm |

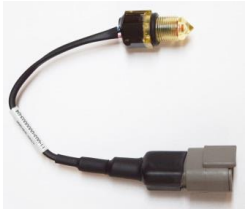
### 6.11.3 Work Steps:

1. Lift the right side of the spill tray up while sliding it to the right. The leak sensor is on the left side of the drip pan.
2. Unplug the Leak sensor from the cable in the bottom of the RackCDU. The cable is tucked up under the decorative wing.
3. Remove the spill tray fully from the RackCDU extension.
4. Remove the Leak Sensor from the bracket by rotating it out with wrench.
5. Install the new Leak Sensor to the bracket.
6. Plug the Leak Sensor cable to the cable in the bottom of the RackCDU.
7. Slide the left end of the spill tray under the decorative wig of the RackCDU manifold while lowering the right edge down and into place3.

## 6.12 Replace Level Sensor

The server coolant level sensor is connected to the server coolant reservoir located at the top of the RackCDU extension. The only service available for the sever coolant level sensor is to remove and replace it.

Note: this sensor looks very much like the leak detection sensor. However the function is different and the two sensors are not interchangeable. Double-check the label on the cable to make sure you have the correct part.



### 6.12.1 Parts needed

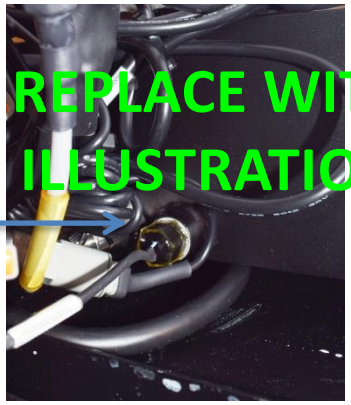
| Asetek P/N | Description |
|---|---|
| 11-900-0000107 | Level sensor RackCDU |

### 6.12.2 Tools needed

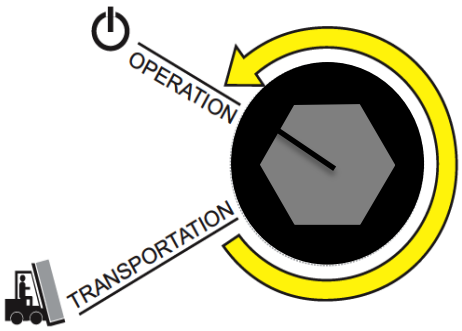
| Asetek P/N | Description |
|---|---|
| n/a | #2 Philips Screwdriver |
| n/a | Step Ladder |
| n/a | Wrench, 24mm |
| | Wrench: 16 mm |
| | Low-sided Pan |
| | Funnel with a small end opening of 18 mm or less |

### 6.12.3 How to replace the Level Sensor

1. Remove the 4 screws holding the top cover of the RackCDU in place. Two are located bottom far side edge of the cover and two more are located at either end of the reservoir.
2. Set the cover aside.
3. Disconnect the power to the control box.
4. Disconnect Reservoir from the Server Coolant Supply and Return manifolds by disconnecting the top quick connector on each manifold. (Push the quick connector toward the RackCDU until it stops. While still pushing, rotate it counter-clockwise until it stops and pull the connector away from the manifold.)
5. Remove the 5 screws holding the reservoir to the extension: one in each side and two at the lower rear edge of Reservoir and one below the shelf holding the Reservoir.
6. Disconnect level sensor and the pressure sensor cables from the cable harness.
7. Uninstall the control box from the Reservoir by removing the 2 screws at the top and bottom of the box.
8. Lift the reservoir from the extension and move it to a workbench.
9. Remove the cap on the top of the reservoir.
10. Make sure the low-sided pan is clean and then invert the reservoir over the pan to drain the cooling liquid from the reservoir.
11. Set the pan and coolant aside.
12. Use the 16mm wrench rotate the old level sensor counter-clockwise and remove it from the reservoir.
13. Install the new level sensor.



14. Use the funnel and return the coolant from the low-sided pan to the reservoir
15. Replace the cap screwing it fully into the reservoir with your fingers.
16. Reattach the reservoir to the RackCDU extension – five screws.
17. Connect the pressure sensor and level sensor cables to the harness.
18. Reinstall control box on Reservoir.
19. Reconnect power to the control box.
20. Replace the top cover.
21. Reconnect the Reservoir to the RackCDU by connecting the Red Female Connector from the Reservoir to the top Red Male Connector on the RackCDU and the Blue Female Connector from the Reservoir to the top Blue Male Connector on the RackCDU.
22. Rotate the reservoir cap counter-clockwise until the line on the cap aligns with the “OPERATION” line on the top cover.



# 7 Replacing Quick Connectors

Replacing quick connectors requires shutting down and disconnecting all of the servers from the RackCDU. The reservoir must also be disconnected and the RackCDU manifolds drained to the quick connector one below the connector being replace. The two manifolds are connected to one another through the heat exchangers in the RackCDU. Draining one manifold also drains the other.

There is no normal maintenance that requires draining server coolant from a RackCDU and in general this should not be done. Should a RackCDU be drained of coolant while servers are still connected to the RackCDU will likely cause some of the server coolers to be drained as well. The pumps inside a server cooler are not self-priming. Should a server cooler become drained, use the Pump Priming Kit to make sure the cooler is fully primed before starting the server.

### 7.1.1 Parts needed:

| Asetek P/N | Description |
|---|---|
| 11-900-0000100 | Quick Connector, Male, Thread, RED |
| 11-900-0000101 | Quick Connector, Male, Thread, BLUE |
| 35-650-0000006 | Coolant, 35% Glycol, 5L |
| | Acetone Solvent |
| | Cleaning cloth |
| | “Loctite 480” thread locking glue |

### 7.1.2 Tools needed:

| Asetek P/N | Description |
|---|---|
| 35-699-000000X | RackCDU draining kit |
| 35-699-0000002 | Tool kit, Pump Priming Kit, Server Coolers |
| 35-699-0000003 | Tool kit, Quick Connector Wrench Set |
| | Low-sided Pan |
| | Funnel |
| | Torque wrench set to 4Nm. |

### 7.1.3 Work Steps

1. Shut down (turn off) all servers in the RackCDU.
2. Disconnect all external power from the Rack
3. Disconnect the quick connectors for the reservoir tubes at the very top of RackCDU manifolds. (Push the quick connector in until it stops. While still pushing rotate the connector counter-clockwise until it stops. Then slide the connectors apart.)
    4. Disconnect all servers connected to both manifolds above, at the same level and one level below the quick connector that will be changed.
    5. Make sure the low-sided pan is clean.
    6. Place the open end of the tube from the RackCDU Draining tool into the low-sided pan
    7. Connect the quick connector end of the RackCDU Draining tool on the quick connector immediately below the connector that is being changed.
    8. Place the vent quick connector from the RackCDU Draining tool on the top quick connector on one of the manifolds.
    9. Drain all of the coolant that will come out into the low-sided pan.
    10. Set the pan of coolant aside and out of the way.
    11. Disconnect the drain tube and the vent quick connector from the RackCDU.

12. Place the tool for removing male quick connectors over the connector to be removed and unscrew the old quick connector from the RackCDU.
    a. If the body of the male quick connector breaks use the hex key (Allen Wrench) in the quick connector wrench kit to remove the base of the connector from the RackCDU.
13. Clean threads in RackCDU of any remaining glue. Use a small amount of Acetone solvent and a cleaning cloth to dissolve and remove any remaining glue. Take care that glue chips are not pushed into the RackCDU as they may foul quick connector filters.
14. Place three small drops of Loctite near the front of the threads on the male connector.
15. Install a new male quick connector using male quick connector wrench and a torque wrench set to 4Nm. Wait 30 seconds to allow Loctite 480 to cure.
16. Connect the reservoir to RackCDU and remove the filling cap from the reservoir.
17. With the funnel, pour the server coolant from the low-sided pan into the reservoir. CAUTION: the connecting tube between the reservoir and the RackCDU manifold is small and the reservoir does not drain rapidly into the manifold. Refill the reservoir in small steps allowing the liquid to drain from the reservoir into the manifold.

a. If needed the pump priming kit can be used to speed up the draining process.
    i. Install gender-reversing connectors on the pump primer to reverse the flow direction.
    ii. Pumping direction should be from reservoir to RackCDU.
    iii. Connect the Pump Priming Kit between the top cold manifold quick connector and the reservoir.
    iv. Squeeze the pump bladder repeatedly to push coolant into the RackCDU manifold.

18. If some server coolant spilled and was not captured in the low-sided pan, replace it with coolant from the 5L bottle—DO NOT use water or some other coolant to refill the server side of the RackCDU. Doing so will void your warranty and will very likely result in damage to the cooling system over time.
19. Once all of the server coolant is returned to the reservoir begin re-connecting servers. Start with the lowest servers and periodically use the pump priming tool to make sure that the servers are getting coolant. If the rack was drained before the servers were disconnected use the pump priming tool on every server as it is reconnected.
20. Once the filling process is completed, replace the reservoir cap screwing it all the way into the reservoir then rotating it counter-clockwise until the line on the cap aligns with the “OPERATION” line on the RackCDU cover.
21. Reconnect the rack to external power.
22. Restart the servers.